

Claims

What is claimed is:

1. A system for measuring characteristics of a substrate, comprising:  
a positioning system having a support operative to receive a substrate, the positioning system being operative to rotate the substrate supported thereby about an axis extending through the support and the substrate;  
a measurement system having a source operative to emit an incident beam onto the substrate; and  
a control system operable to control the source to selectively emit the incident beam based on an angular orientation of the substrate such that the incident beam selectively interrogates a region of the substrate near the axis.
2. The system of claim 1, the source being a light source operative to emit an incident light beam.
3. The system of claim 2, the measurement system further comprising a spectrometer operative to detect at least one of reflected and diffracted light in response to interaction of the incident beam with the substrate, the spectrometer providing a detector signal indicative of optical properties of the at least one of reflected and diffracted light.
4. The system of claim 3, at least one of the measurement system and the control system determining substrate characteristics based on the detector signal.
5. The system of claim 4, further comprising a process system operatively coupled with the control system operative to at least one of apply material onto and remove materials from the substrate during an associated fabrication process, which is monitored by the measurement system.

6. The system of claim 5, the control system being operable to adjust operating characteristics associated with at least one of the positioning system, the process system, and the light source based on the detector.
7. A system for measuring characteristics of a moving substrate, comprising:  
a positioning system having a support for receiving a substrate, the positioning system rotating the substrate supported thereby about an axis; and  
a measurement system having a light source which, when activated, emits an incident light beam onto a central region of the substrate near the axis, the activation of the light source being controlled in synchronization with rotation of the support so as to selectively interrogate the substrate when at a desired orientation relative to the light source.
8. The system of claim 7, the measurement system further comprising a light detector operative to detect a light beam produced in response to the incident beam interacting with the substrate.
9. The system of claim 8, the light detector further comprising a spectrometer, the spectrometer providing a signal indicative of substrate characteristics for a substrate location illuminated by the incident beam.
10. The system of claim 9, further comprising a control system coupled to the positioning system and the measurement system, the control system controlling the light source to emit the incident beam in synchronization with rotation of the substrate, such that the incident beam selectively interrogates the central region of the substrate.
11. The system of claim 10, the substrate having at least one of features and ratings near the central region of the substrate, the control system controlling activation of the light source to emit the incident beam when the at least one of features and ratings are at a desired angular orientation relative to the light source.

12. The system of claim 11, further comprising a process system operatively coupled with the control system and operative to at least one of apply material onto and remove material from the substrate during a fabrication process in which the measurement system is implemented to monitor substrate characteristics.
13. The system of claim 12, the control system being operable to adjust operating characteristics associated with at least one of the positioning system, the process system, and the light source based on the signal indicative of substrate characteristics.
14. A system for measuring characteristics of a substrate, comprising:  
means for rotating a substrate within a processing environment about an axis;  
means for emitting an incident light beam onto the substrate near the axis;  
means for detecting at least one of reflected and diffracted light in response to interaction of the incident light beam and the substrate; and  
means for controlling the means for emitting to intermittently emit the incident light beam onto the substrate near the axis based on the angular orientation of the substrate relative to the means for emitting.
15. The system of claim 14, further comprising means for at least one of applying material onto and removing material from the substrate during a fabrication process, the means for emitting and means for detecting being implemented to measure substrate characteristics during the fabrication process.
16. The system of claim 12, the means for controlling further comprising means for adjusting operating characteristics associated with at least one of the positioning system, the process system, and the light source based on the substrate characteristics measured during the fabrication process.
17. A method for measuring characteristics of a substrate, comprising:  
rotating a substrate about a rotational axis extending through the substrate

while supported within a processing environment;

emitting an incident light beam onto the substrate near the rotational axis; and  
controlling the emitting to emit the incident beam based on the angular  
orientation of the substrate, whereby the incident beam can selectively interrogate the  
substrate near the rotational axis when at a desired angular orientation relative to the  
incident light beam.

18. The method of claim 17, the emitting the incident light beam further  
comprising intermittently emitting the incident beam when the substrate is at a desired  
angular orientation relative to the incident light beam.

19. The method of claim 18, further comprising detecting at least one of reflected  
and diffracted light in response to the incident light beam interacting with the  
substrate.

20. The method of claim 19, further comprising using a scatterometry technique to  
discern optical characteristics of the detected light and determining substrate  
characteristics based on the discerned optical characteristics.

21. The method of claim 20, the substrate including at least one of features and  
gratings near the rotational axis, the method further comprising controlling the  
emitting of the incident light beam according to when the at least one of features and  
ratings are at a desired angular orientation relative to the incident light beam.

22. The method of claim 21, further comprising at least one of applying and  
removing materials relative to the substrate during a fabrication process, and adjusting  
operating parameters associated with at least one of the rotating, the at least one of  
applying and removing, and the emitting based on the determined substrate  
characteristics.